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OF THE

GEOLOGICAL SURVEY

OF

THE UNITED KINGDOM.

Figures and Descriptions

ILLUSTRATIVE OF

BRITISH ORGANIC REMAINS.

DECADE III.

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NOTICE.

Palæontological researches forming so essential a part of geological investigations, such as those now in progress by the Geological Survey of the United Kingdom, the accompanying plates and descriptions of British Fossils have been prepared as part of the Geological Memoirs. They constitute a needful portion of the publications of the Geological Survey, and are taken from specimens in the public collections, or lent to the Survey by those anxious to advance this branch of the public service.

The plan proposed to be followed in the work, of which this Decade forms a part, is as follows:—

To figure in elaborate detail, as completely as possible, a selection of fossils, illustrative of the genera and more remarkable species of all classes of animals and plants the remains of which are contained in British rocks; to select especially such as require an amount of illustration which, to be carried out by private enterprise, would require a large outlay of money, with little prospect of a return, and a long time to accomplish, but which, by means of the staff and appliances necessarily employed on the Geological Survey, can be effected at small cost, and with a rapidity demanded by the publication of the Maps and Memoirs of the Survey; thus, it is hoped, affording an aid to those engaged in the sciences with which this work is connected, that they might not otherwise have possessed, and which may materially promote the progress of individual research.

H. T. De la Beche,
Director-General.

Geological Survey Office, Jermyn Street,
30*th June*, 1850.

BRITISH FOSSILS.

DECADE THE THIRD.

The third Decade of representations of British Fossils follows up the subject of the first, and continues the series of illustrations of the genera and species of extinct Echinodermata, especially those belonging to the orders *Asteriadæ* and *Echinidæ*.

The genera illustrated in this Decade are partly new, partly long-established; so also with the species, some of the most remarkable of unpublished forms having been selected, as well as some of the commonest and best known fossils. Yet, even respecting those which are so familiar that their whole history is believed to have been long ago made out, there is so much to be cleared up, so many points of structure hitherto very imperfectly or not at all elucidated, and such an accumulation of synonyms, that their investigation is much more laborious, and occupies much longer time, than inquiries into entirely new types. Thus, three of the fossils figured and described in this Decade, *Hemicidaris intermedia*, *Galerites albogalerus*, and *Micraster cor-anguinum*, are so familiar to geologists and naturalists, so abundant and so well preserved, that authors do not hesitate to cite them without comment, as if they were free from any obscurity. Nevertheless, I may say confidently, that not until now has the literature of these well-known and often-described forms been cleared up, and many of the most important points in their organization made known. Common as they are, no representations of them, presenting sufficient details of their structure, have ever appeared before.

Among the new forms now first described and figured, some are of singular interest. Two of them, the *Lepidaster Grayii* and the *Tropidaster pectinatus*, are not only new as species, but unquestionably possess features entitling them to become the types of new genera. Of those

belonging to old genera, the *Uraster Gaveyi* is singularly interesting, presenting, as it does, the spectacle of a Liassic echinoderm, which so closely resembles the commonest star-fish now living in the British seas, that it can only be distinguished from it by a minute and critical comparison; and the *Hemicidaris Purbeckensis* is remarkable as being the first member of its tribe ever discovered in strata of the Purbeck series.

The species described and figured have been selected from formations of different geological epochs. From Silurian rocks *Lepidaster Grayii* has been taken; from older secondary strata, the two forms of *Hemicidaris*, the *Galerites* (*Holectypus*) *hemisphærica*, chosen on account of its being new to Britain, and also affording an excellent illustration of the sub-genus to which it belongs, and the *Dysaster ringens*, selected for the same reasons; also the new star-fishes, species of *Uraster* and *Tropidaster*, already alluded to. Of cretaceous fossils there are the critical *Galerites castaneus*, and the characteristic *Galerites albogalerus* and *Micraster cor-anguinum*.

A third series of illustrations of the fossil Echinoderms is far advanced, and in preparation for publication.

Edward Forbes.

June, 1850.

BRITISH FOSSILS.

Decade III. Plate II.

URASTER GAVEYI.

[Genus URASTER. Agassiz. (Sub-kingdom Radiata. Class Echinodermata. Order Asteriadæ. Family Urasteriæ.) Body stellate, five-rayed; a vent on the dorsal surface; rays rounded, surface spinous; ossicula small, compressed, irregular, reticularly combined; ambulacra bordered by three sets of spines; suckers quadriserial. The genera Asteracanthion of Müller and Troschel, and Asterias (restricted) of J. E. Gray, are synonymous with Uraster.]

Diagnosis. *U. brachiis quinis, lanceolatis; paginâ superiori valde spinosâ, spinis brevibus, teretibus; ossiculis ambulacralibus linearibus, arcuatis, carinatis, carinâ extus sulcatâ intus fossatâ.*

Description.—This remarkable star-fish is of the shape and dimensions of the common living *Uraster rubens*, to which it presents also a striking resemblance in the details of its structure. Indeed, were this lias fossil to be resuscitated and cast upon our shores now, the British naturalist would see in it only a new but by no means surprising form of *Uraster*, having close affinities with, and requiring to be distinguished by critical characters from, the commonest of our native *Asteriadæ*.

The under surface of the specimen is the one exposed, but sufficient of the upper side is exhibited at the sides of the arms to show its structure and armature. The whole of the upper surface of the rays and disk appears to have been covered with thickly-set, rather short, tapering spines, mingled with smaller and slenderer ones, and traces of *pedicellariæ*. The ambulacra are bordered by closely-set narrow plates with steep inner sides, and having their upper surfaces convexly curved and indented by about five depressions, indicating the sockets of as many rather short, slender, and rounded marginal spines. The ambulacra themselves are rather wide and flattened; down the centre of each is a shallow grove marking the line of junction of the ambulacral ossicula. These are very narrow and linear in shape, slightly bent, with the appearance of a very shallow sigmoid curve. This is caused by the curved keel which runs down each, grooved throughout two-thirds of its length, but depressed and marked with two pit-like

impressions in the neighbourhood of the ambulacral sulcus; the ends of the ossicula which go to form the sulcus are slightly denticulated. The curvation of the ossicula has reference to the disposition of the suckers, which in this genus are arranged in four series down each avenue. The perforations are slightly ovate in this species.

Dimensions.

	Inches.
Breadth of disk	$1\frac{3}{12}$
Maximum breadth of a ray	$0\frac{8}{12}$
Maximum breadth of an ambulacrum	$0\frac{5}{12}$
Length of a ray from angle of junction with the body	$3\frac{1}{12}$
Length of an ambulacrum from its origin at the mouth	4

Affinities.—This species, as I have already indicated, approaches more nearly to the existing *Uraster rubens* and its allies than to any described secondary or palæozoic fossil. The *Asterias lumbricalis* and the *Asterias lanceolata* of Goldfuss, both from the jurassic beds in Germany, have been referred by me to the genus *Uraster*,* but they are imperfect forms at best, and possibly, when found in more complete condition, may prove to belong to other generic types. Not so with the star-fish now described; there can be no mistake about its generic position and affinities, as the most essential part of its osseous framework, the ambulacral skeleton, is perfectly preserved.

Locality and Geological Position.—The only specimen hitherto found of this singular and beautiful fossil occurred in the Lias beds laid open during the excavation of Mickleton Tunnel, in Gloucestershire. It was discovered by Mr. G. E. Gavey, civil engineer, of Chipping Campden, Gloucestershire, who most liberally communicated it for description and delineation to the Geological Survey. It lies on the surface of a sandstone associated with fragments of Pentacrinites, small Ammonites, Aviculæ, and small univalves.

Description of the Plate.

Fig. 1. The fossil, natural size.
Fig. 2. Plan of the ambulacral plates and their spiny borders.
Fig. 3. Diagram of the same parts in the living *Uraster rubens*, introduced for comparison.

Edward Forbes.

June, 1850.

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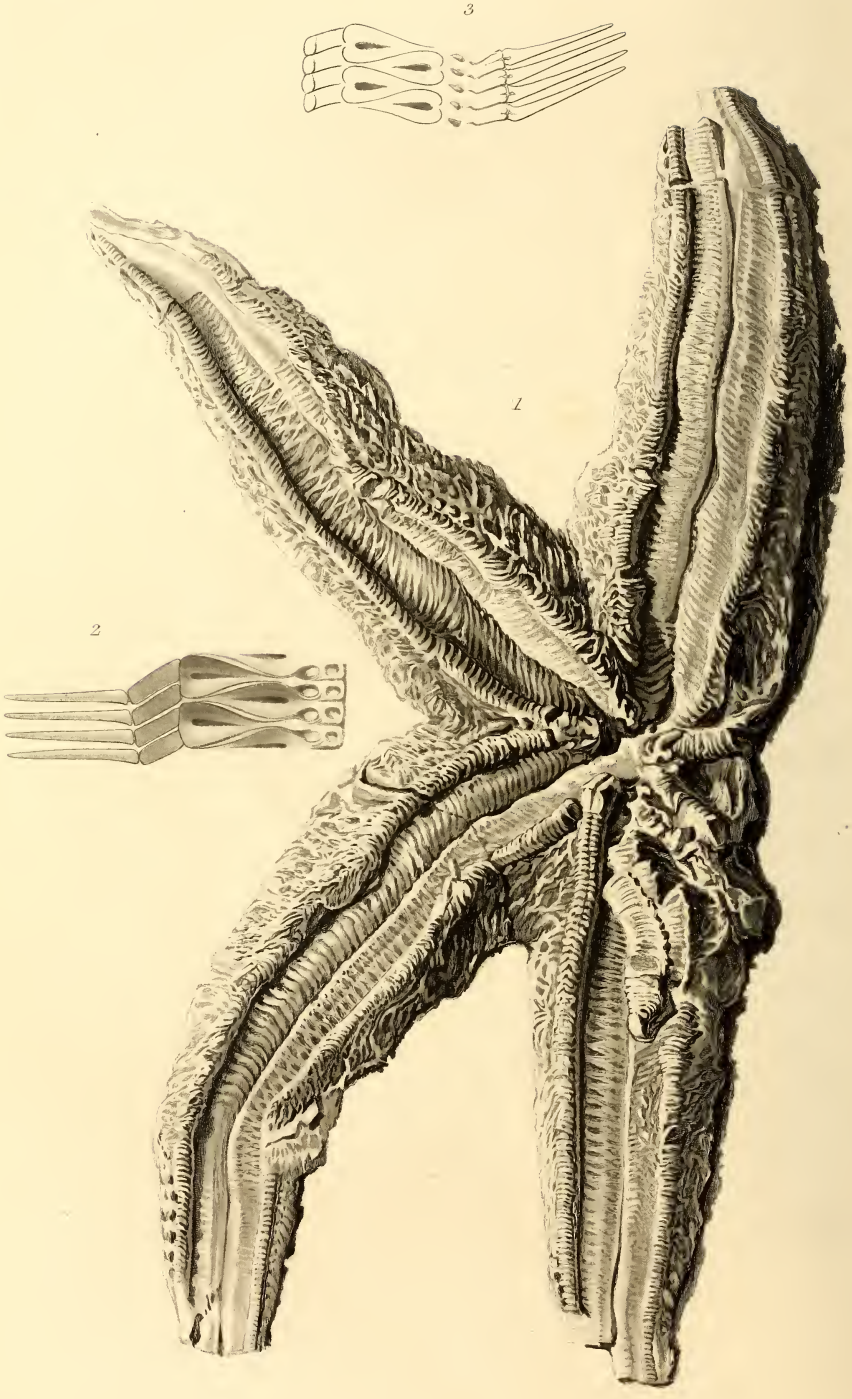
* See "Table of Fossil Asteriadæ" in vol. ii. pt. 2, p. 481, of the "Memoirs of the Geological Survey of Great Britain."

Geological Survey of the United Kingdom.

URASTER
(Oolitic)



URASTER GAVEYI — *Forbes*